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THE OPHTHALMIC REVIEW

A MONTHLY RECORD OF OPHTHALMIC SCIENCE

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THE SURGICAL TREATMENT OF TRACHOMA.*

By Sydney Stephenson, M.B.
Surgeon to the Ophthalmic School, Hanwell, W.

At the present moment, we witness the curious sight of two contending schools, of which one is opposed to almost all operative measures, while the other urges that surgical means alone should be employed in the treatment of trachoma. Fuchs, on the one hand, would operate only in those rare cases where the morbid process is strictly limited to particular portions of the conjunctiva. Jacobson, on the other hand, derides all treatment by local applications, and claims that a radical cure can be attained by surgical interference only.

Such differences of opinion among distinguished observers show that the relative value of surgical and escharotic treatment is still open to question. My own experience leads me to the following conclusions. Trachoma, beyond a doubt, can be cured by local applications to the conjunctiva. The success of this plan can, however, be attained only after a patient course of treatment extending over many months or even years. The tedious course thus entailed may be abridged, often with brilliance and certainty, by the timely use of surgical measures. Were I asked to sum up the results of my personal experience in a few words, I should say

* Abstract of paper read at the Annual Meeting of the British Medical Association, held at Nottingham, July, 1892.

that when used with judgment, operative measures are simply invaluable in trachoma. At the same time it cannot be too often repeated that surgical measures must not be used to the exclusion of those therapeutic means without which full justice can be done to no case.

Although I have tried many methods in trachoma, I shall limit my remarks to a discussion of two operative procedures, namely, "expression" of the morbid material, and excision of the conjunctival *cul-de-sac*. I observe that limit, first, because I have had more extended experience of those than of some other operations, and secondly, because I have found the operations to be described no less simple in their performance than satisfactory in their results.

Expression of the peccant material from the conjunctiva was recommended by Pilz in 1854, and practised by the late Sir William Wilde years ago. Mandelstamm and Hotz were, however, the authors chiefly instrumental in raising the procedure to the position and dignity of a formal operation.

The exact method employed to express the follicles varies, as might be expected, in the practice of different surgeons. Perhaps, however, the most noteworthy improvement is that of H. Knapp, who has devised a pair of roller forceps. In my own operations I employ two kinds of forceps: (1) ordinary stout dissecting forceps, and (2) roller forceps modified from Knapp's pattern. Thus, the rollers in my instrument are 9 or 10 mm. in length, that is to say, about half the length of those in Knapp's model. Further experience has convinced me that the comparatively small diameter (1 to 1.5 mm.) recommended by Knapp is insufficient to allow the rolling action of the instrument to come into play when dealing with swollen tissues. In my own instrument, therefore, the diameter of each cylinder is at least 3 mm.

Expression, which I have performed frequently, is indicated in the following conditions.

(1) Follicular disease in which discrete follicles are scattered over the surface of an otherwise normal conjunctiva. Here it is an easy matter to seize and crush each individual follicle with dissecting forceps, and beyond this nothing more need be done in the majority of cases.

(2) In trachoma of recent origin, expression often yields excellent results. As a first step it is necessary to squeeze out the contents of any grains which project markedly above the level of the conjunctiva, and then to subject the retro-tarsal folds and the entire extent of the conjunctiva of the lids to the squeezing process. The instrument I prefer for this latter purpose is the stirrup-forceps, and a word in regard to its method of employment may not be out of place. First, one roller may be placed on the cutaneous and the other on the conjunctival surface of either lid. The blades are then closed, and the forceps firmly drawn towards the free margin of the lids, by which means the roller action is brought into play, and the morbid material squeezed out from the conjunctiva. In the second method the upper lid is everted, one roller pushed deeply into the *cul-de-sac*, and the other placed over the tarsal conjunctiva as near the free border of the lid as possible. The blades are then closed, and the instrument drawn towards the free edge of the folded conjunctiva, so that each roller is in contact with mucous membrane only throughout the whole of these manipulations. In the third method, a swollen and granular fornix may be exposed, and submitted bodily to the action of the forceps. The material thus expressed is often forcibly thrown to a considerable distance, and may fall into the operator's eye—an accident not unlikely to be followed by serious consequences. In order to meet the contingency, it might be well for the surgeon to wear a pair of protective goggles.

The tarsus should be subjected to considerable pres-

sure during the performance of the operation. Further, the caruncle and the extremities of the superior fornix—which may be regarded as especial fastnesses of infectious material—should receive particular attention. In these positions the dissecting forceps may often be used with advantage.

(3) In old and obstinate cases of trachoma, expression at times affords results of an unexpected nature. The details of operation differ, however, in no respect from those already described.

The painful character of expression leads many surgeons to employ a general anæsthetic. Personally, I have never used anything but cocaine. All the lids may, if necessary, be operated upon at one and the same sitting.

The conjunctiva is extremely tolerant of the apparently rough treatment involved in the operation of expression. The softer material of the granulations breaks down long before the pressure used is sufficient to damage the conjunctiva itself, and the surgeon can at once judge when enough has been done not only by the appearance of the parts, but also by the feeling of the tissue underneath the forceps.

As a general rule, remarkably little reaction follows the operation. One point should, however, be noted. Adhesions are liable to form between adjacent folds of conjunctiva, more especially in the lower lid, and such adhesions should be searched for systematically, and broken down with a probe.

To complete the cure of trachoma in any given case, expression may have to be repeated several times.

Excision of the cul-de-sac.—The practice of cutting out pieces of diseased conjunctiva has been advocated since the days of Hippocrates. Galezowski was, however, the first to recommend excision of the *cul-de-sac* as a definite method of treatment. His paper was published in 1874. Since that year the operation has

been practised and recommended by many surgeons, among whom may be mentioned Brachet, Voukché-vitch, Schneller, Jacobson, Heisrath, and Treitel.

A fear has found expression in many quarters that excision of the retro-tarsal folds would give rise to malpositions of the eyelids, ptosis, or excessive scar-changes. For my own part, I have now performed the operation on thirty-seven eyes, and many of my patients have been under observation for upwards of three years. Once only have I seen any untoward result. In that case unequal contraction took place in the scar, and for a time the inner surface of the upper lid showed a groove running down its centre. Seven weeks after the first operation the cicatrix was dissected up, and a strip of rabbit's conjunctiva placed between its cut surfaces. This simple expedient succeeded in permanently removing the distortion of the lid.

As a point of considerable practical interest it may be mentioned that I have several times seen the ptosis of severe trachoma actually benefited by excision of the superior *cul-de-sac*. It would seem as if removal of the swollen and loose conjunctiva enabled the levator muscle to act to better advantage, and so alleviated the drooping of the upper lid.

At this point a simple method of removing the upper *cul-de-sac*, which I have practised in all my cases, may be briefly described. The upper lid is everted, and the *cul-de-sac* brought well into view. Through the extremities of the fold, two moderately strong silk sutures are passed, the free ends of which are given to an assistant with directions to keep the *cul-de-sac* everted and "on the stretch" during the subsequent proceedings. An incision is then made with blunt-pointed scissors along the line of attachment of the fornix to the tarsus. This incision should, however, include nothing beyond the anterior layer of the *cul-de-sac*. As soon as that layer is freed from its attachments, a dis-

section is made into the sub-conjunctival cellular tissue, and carried as far backwards as the surgeon deems necessary. The dissection will be materially assisted by an intelligent manipulation of the sutures attached to the fornix. Finally, the operation is completed by cutting transversely through the posterior layer of the *cul-de-sac*, which thus comes away bodily together with its attached sutures.

When the palpebral apertures are preternaturally small, I have no hesitation in dividing the tissues at the outer angle of the eye before excising the *cul-de-sac*. Since a permanent enlargement of the palpebral fissure is desirable under these circumstances, it is well to secure the patency of the opening by three sutures applied in a manner too well known to call for separate description (canthoplasty).

During excision of the *cul-de-sac*, bleeding is often free, and it may be sometimes necessary to twist one or two small spouting vessels. I never employ any sutures to close the wound.

I attach considerable importance to a policy of non-interference in the after-treatment of the case; thus I do not inspect the wound for five or six days after the operation unless there are special reasons to the contrary.

Ecchymosis of the lids, hæmorrhage into the conjunctiva, or chemosis is often observed after removal of the *cul-de-sac*. Two complications seem to call for more extended notice, namely, ptosis and the growth of wound-granulations. It is necessary to distinguish carefully between temporary and permanent ptosis resulting from excision of the upper *cul-de-sac*. The former, which is commonly present, is due, no doubt, to general swelling of the parts. It possesses no particular significance, and disappears in process of time. Permanent ptosis owns, upon the other hand, a different cause. It can only follow excision of the fornix when

that operation has involved interference with the tarsal insertion of the levator palpebræ muscle. The second complication—the appearance of wound-granulations—was observed in ten of my cases. With regard to these growths, it may be pointed out that it is quite useless to apply caustic to them; they should be snipped away with curved scissors.

Many reasons have led me to remove the upper in preference to the lower *cul-de-sac*. Owing probably to the fact that the superior fornix contains a relatively large amount of adenoid tissue, it is usual to find the trachomatous processes more advanced there than elsewhere. Furthermore, the inaccessible position of the retro-tarsal fold renders it a matter of the greatest difficulty to apply local remedies efficiently to its surface. From these reasons it often comes about that, even after a tedious course of local treatment, the upper fold contains an abundance of granular conjunctiva, while the other parts of the lids are for all practical purposes restored to a healthy condition. It is a fact sufficiently familiar to ophthalmic surgeons, that relapses of trachoma take their origin in the majority of cases from the tissues of the upper *cul-de-sac*—a tendency which is doubtless related to the above-mentioned difficulty of applying local treatment to its surface. Again, the condition of the cornea is closely dependent on that of the upper retro-tarsal fold. Pannus, for example, almost always occurs with a swollen, congested, and thickened fold, and I may say, indeed, that in my experience corneal changes are rarely met with when the condition of the upper *cul-de-sac* is really satisfactory. Lastly, I may add my conviction that an excision limited to the upper *cul-de-sac* is capable of favourably influencing the disease in other parts of the conjunctiva, and that local remedies, useless before the operation, often act well after its performance.

What cases are likely to receive benefit from removal

of the upper *cul-de-sac ?* The first and foremost place must be assigned to those examples of chronic trachoma in which the ordinary treatment by escharotics has proved unavailing. No matter what be the particular agent used in such cases, no matter how that agent be applied, the condition of the conjunctiva gets steadily worse ; such cases are the mere despair of surgery. The second class of case in which the operation is indicated is that in which the upper fornix is occupied by a mass of voluminous and reddened conjunctiva, often folded in an extraordinary way. Here excision will often render invaluable aid to the surgeon in his efforts to quell the disease.

Attention may now be directed to some of the advantages possessed by the method of operation described above. The operation is easy of performance. So far from any special instruments being needed, a pair of scissors, a needle, and some silk complete the surgical outfit. A further advantage lies in the fact that by this method one may remove just as much or as little conjunctiva as the nature of the case requires. Ordinarily, one takes away an oblong piece of the *cul-de-sac* measuring, say, 28 by 9 mm. There are cases, however, in which a smaller or a larger excision may be performed with advantage. Lastly, if the fold be removed according to the principles already laid down, the tendon of the levator palpebræ superioris runs little, if any, risk of damage. In other words, the operation is not likely to be followed by permanent ptosis—a point of obvious practical importance.

The advocates of excision claim excellent results from the operation. They affirm that the treatment of trachoma is abridged ; that corneal complications speedily clear up ; and that the operation affords a great, if not an absolute, protection against the occurrence of relapses. Their statements tally with my own experience, and I am of opinion that in excision of the upper transition-

fold we have an operation easy of performance, free from danger, and satisfactory in its results.

One word in conclusion. I should wish to state clearly that I am in no sense an advocate for surgical intervention in ordinary cases of trachoma. Everyday treatment suffices for the common run of cases. Surgical measures, it cannot be too often repeated, are called for exceptionally only, and even then they require to be supplemented by the use of local remedies.

W. SCHOEN (Leipzig). The Functional Diseases of the Eyes: the Causes and Prevention of Cataract and Glaucoma. *Wiesbaden: J. F. Bergmann*, 1893.

The author of this work uses the term functional diseases to signify those disorders which are, in his opinion, induced by the over-exercise of certain functions—convergence and accommodation. That excess of convergence tends to produce changes in the form of the globe has long been taught. The changes produced by excess of accommodation are here systematically dealt with for the first time. The book contains three hundred pages of text, and advances much debateable matter; it is therefore impossible here to do justice either to the author's arguments or to the many objections which might be, and have been, urged against them. We can only give a general idea of his position, offer a few criticisms, and recommend the book to those who are willing to re-examine current doctrines from the point of view of a heterodox but very earnest writer.

Starting from his own observation that glaucoma is often met with in eyes which have suffered from a high degree of uncorrected hypermetropic astigmatism, and pursuing this clue in various directions, Schoen arrived at the

general conclusion that the eye is liable under functional strain to undergo changes in regard to its length and form, the position of its tunics, and its refraction; and that an excess of accommodative effort, in particular, induces changes which in their highest development constitute cataract and glaucoma.

The book consists of four main sections: (1) The Physiology of Accommodation and Convergence; (2) The Pathology of Accommodation, *i.e.*, the causes which lead to excessive effort, and the several evil consequences of such effort; (3) The Pathology of Convergence; (4) The Prophylaxis and Therapy of Strain of Accommodation and Convergence.

Begging the reader to free his mind from the trammels of authority, and to remember that certain current doctrines concerning the mechanism of the accommodation, the nature of glaucoma, and the origin of cataract are still mere hypotheses, and would be so regarded were it not for the authority of the men who have advocated them, the author proceeds to analyse the accommodation-theory of Helmholtz. He claims especially to demonstrate that the tension of the zonula, far from being diminished during accommodation, is increased. His own theory is not easily grasped, and it is still less easily explained without the aid of the author's profusely lettered diagrams, but the following, if we understand them rightly, are the main points.

In the ciliary muscle three different sets of fibres are to be distinguished; in the zonula three different sets of cords. Each set, in each case, exercises a somewhat different function according to the direction of its traction and resistance. The suprachoroidal tissue constitutes a tendon for the ciliary muscle which, passing completely round the eye, is inserted into the sheath of the optic nerve. The vitreous body is therefore completely embraced by this continuation of the ciliary muscle. The fibres of the zonula, passing from the ciliary body to the anterior surface of the lens, bind lens and vitreous together into one globular mass. During accommodation the contraction of

the ciliary circle causes an increased pressure on the whole surface of the vitreous body, and hence an increased tension in the zonula. The tightened zonula pulling in a somewhat backward direction on the margin of the lens increases the convexity of this latter. Thus the united mass of lens and vitreous is compressed by the contraction of the ciliary muscle and changes its globular form into an egg-like form, and the increased convexity of the lens is a part of this change. That the lens becomes more convex by its own elasticity is neither admitted nor denied; it is not necessary to the theory.

It appears to us that this theory, if we understand it rightly, includes at least one fallacy. Schoen assumes that the accommodative act raises the pressure in the vitreous body, and then argues that this must tend to push the lens forward and to increase the tension of the zonula. He contends that even the smallest relaxation of the tension of the zonula is physically impossible, and in support of this contention he uses the following illustration:—Let a cord be fastened to two fixed points so as to hang not quite tightly between them, and let a weight be hung on the middle of the cord; the cord is in a certain state of tension. Now let the points of attachment be brought nearer together; the cord is thereby slackened as regards the points of attachment, but since it still carries the same weight its tension remains the same as before. Herein lies an obvious fallacy: the tension of the cord will decrease as its points of support are approximated, and increase as they are separated more widely. A thread which will just bear a given weight when the supports are near together will break when they are farther apart. Similarly, if the approximation of the two sides of the ciliary circle causes certain fibres of the zonula to change their direction and lie in a more cone-like form, the tension on these fibres is thereby diminished. Moreover, the alleged increase of vitreous pressure during the act of accommodation is purely hypothetical, and its amount must in any case be extremely small. Careful manometrical experiments on the eyes of animals during the electrical induction of the

accommodative act have failed to detect the slightest change of pressure either in the aqueous or vitreous chamber. Schoen meets this difficulty by asserting that the lower animals have little or no accommodative power. We would venture to refer him, amongst much other evidence, to the record of an experiment which rendered the accommodative act clearly visible in the eye of a rabbit (*British Medical Journal*, Dec. 6th, 1873). The current theory of accommodation will not fall, we think, before this attack, and does not owe its stability merely to the great name of Helmholtz.

Section 2 deals in the first place with the causes of accommodative strain—hypermetropia, presbyopia, astigmatism, corneal opacities, bad light, fine work, the habit of looking too closely, the use of too strong concave glasses, insufficiency of the internal recti—and in the second place with the consequences of such strain. He urges that while the anatomical changes which are induced by overstrain of the heart and many other muscles have been fully recognised, the analogous results of over-strain of the ciliary muscle have been comparatively neglected. Having briefly referred to the general nerve disturbances thus induced, the lacrymation and dazzling, and the spasm of the orbicular muscle, sphincter of the iris and internal recti, he passes on to a group of changes which are not generally ascribed to this cause.

Habitual accommodative effort is the cause of the shallow anterior chamber which is almost always found in elderly hypermetropes and presbyopes; the position of the lens proper to active accommodation has become permanent. This is Schoen's statement. Without denying that it may be true in part, we would point out that the increased volume of the lens in advanced life accounts for a certain diminution in the depth of the chamber, and that a simple advance of the lens, especially if it represents an accommodative change, is not in accordance with the continued diminution of refractive power proper to this period of life.

Further, according to Schoen, accommodative strain

leads to structural changes in those parts which are subjected to the excessive traction, namely, in the cornea by the traction of the insertion of the ciliary muscle, in the lens by the traction of the zonula, and in the optic disc by the traction of the tendon of the muscle.

In the cornea the changes are of two kinds: (1) the recurrent inflammation to which hypermetropic and astigmatic eyes are especially liable, and which can only be permanently cured by correction of the refraction; (2) an increase of refraction in the horizontal meridian. Statistics are given to show that with the advance of life the vertical meridian of the cornea diminishes, while the horizontal meridian increases, in convexity; in other words, that the normal type of astigmatism changes as life advances into the inverse form. Among young astigmatics one-tenth only presented inverse astigmatism, while among astigmatics of 60 years of age it was present in two-thirds—an interesting and important fact, whether we accept the author's somewhat complex explanation of it or not. It must be noted that Schoen estimated the astigmatism by the subjective method only, so that there is nothing to show whether the alleged change is corneal or lental.

In the lens Schoen locates still more important accommodative changes. Having criticised the various theories which have been advanced concerning the causes of cataract, insisting especially that there is no proof of its dependence on malnutrition and shrinking of the lens, he describes minutely his own microscopical and clinical observations which may be briefly summarised as follows. The first grey streaks in a simple cataract depend upon a coagulation-necrosis of the subcapsular epithelium—a change analogous with the formation of casts in the kidney. It is a consequence of the traction on the capsule and its separation from the lens substance. The capsule exhibits meridional folds corresponding with the attachments of the middle layer of the zonula fibres; its separation is usually limited to the equatorial region, but may extend further over the surfaces. In the living eye

the first stage of cataract is only discoverable with a widely dilated pupil and accurate focal illumination. Minute grey streaks and dots are visible immediately beneath the capsule in the lines of insertion of the anterior and middle zonula fibres. They commonly appear first on the horizontal meridian. They are not visible at first by transmitted light. In a later stage the anterior and posterior series extend and blend so as to include the equator itself, or they may blend laterally so as to form an anterior and a posterior complete circle, leaving the equator itself still free. These changes are accompanied by more or less proliferation of the epithelium. The most recent lens fibres atrophy, then those a little older, and lastly a general disturbance of the nutrition of the lens sets in and the cataract becomes total. In lamellar cataract the visible changes lie at a variable depth in the substance of the lens, but in other respects very closely resemble those which characterise the onset of senile cataract.

The term senile cataract is objectionable because the first stage of the disorder is quite common at a comparatively early age. Among more than 6,000 eyes accurately examined by Schoen with regard to their vision and media, 18 per cent. showed simple (senile) cataract in one or other stage; the percentage was of course greatest among the oldest persons, but was considerable even in early life. Thus the changes were found in 12 per cent. of the persons aged 20 to 30; in 22 per cent. of those aged 40 to 50; in 67 per cent. of those aged more than 70. It is obvious, therefore, that only a very small proportion of those lenses which are altered in this way ever reach the stage of mature cataract. The beginning of cataract in the human eye must be considered the rule and not the exception. Further statistics are given to show that in a large proportion of cases the changes begin in the horizontal meridian, *i.e.*, at the inner or outer side of the lens.

In proof of the connection between cataract and accommodative strain the following statistics are given: of 1151 eyes which showed the beginning of cataract but still

permitted an accurate test of refraction, 35 per cent. were hypermetropic, 36 per cent. astigmatic, 12 per cent. emmetropic, 17 per cent. myopic. The large majority, therefore, had astigmatism or hypermetropia.

In view of the similarity between lamellar cataract and the ordinary form, Schoen would attribute the former also to accommodative strain, and the fact that lamellar cataract often dates from an early fœtal period is not to him insuperable. Dental malformation and a history of convulsions are commonly to be found in these cases. During the convulsion why not a simultaneous cramp of the ciliary muscle? We are not told, however, anything as to the occurrence of fœtal convulsions or as to the development of the accommodative apparatus at that early period.

Seeing that a great number of eyes show the initial changes, while comparatively few pass on to the full development of cataract; seeing that the first changes are discoverable twenty or thirty years before the final stage is to be feared; seeing also that the primary necrosis of the subcapsular epithelium may be restored by proliferation, and that lamellar cataract affords an example of a stationary lesion of the same kind, it should be possible, says Schoen, to interfere in time and to arrest the progress of the disorder, by preventing strain of the accommodation.

In the optic disc Schoen finds accommodative changes of a still more surprising character. The tendon of the ciliary muscle, being inserted into the sheath of the optic nerve, makes a lateral traction around the disc, and this traction is the cause both of the so-called physiological cup and of the glaucoma cup. With regard to the physiological cup, certain observations are quoted which show that it is seldom present in young infants, but makes its appearance later. Schoen found a percentage which steadily increased with the advance of life; also a higher percentage in eyes specially liable to accommodative strain, viz., the hypermetropic and astigmatic; also a high percentage of deep excavation in cataractous eyes. He maintains that while a moderate physiological cup is

not in itself dangerous, it indicates persistent accommodative strain, and is therefore a most important warning.

The glaucoma cup, we learn, is the extreme development of the physiological cup and, like this latter, is caused by the traction of the tendon of the ciliary muscle. When the disc has been excavated by this remarkable process, pressure may deepen the cup, but in the absence of such traction it has no power to excavate the disc. This being so, the pressure-theory of glaucoma must obviously fall, and the reputed facts on which it stands must be done away with. Accordingly, we are told that an excess of intra-ocular pressure is the exception, not the rule, in glaucoma simplex; that attacks of glaucoma indicate a sudden loss of power in the meridional fibres of the ciliary muscle, the outer set being responsible for acute glaucoma, the inner set for atonic glaucoma; that the various symptoms, in addition to the cupping of the disc, which we have been accustomed to regard as pressure effects, are all explained by this same failure in one or other portion of the ciliary muscle; and that closure of the filtration angle is not concerned in the onset of a glaucomatous attack. It is pleasant to find the idea of a primary inflammation around the filtration angle opposed by the very arguments which the reviewer himself has been accustomed to use, only, by a curious slip, he is here made responsible for the idea and not for its refutation.

Passing on to the treatment of glaucoma, we find that our author, still guided presumably by his universal theory, has little faith in iridectomy. He knows of no statistics which establish its value. He maintains that its repute rests merely on the continued assertions of its advocates. He assures us that we are deceived in this matter because the patients on whom we operate, finding the promised benefit unrealised, go elsewhere in future, and thus the evil results of our operations remain unknown to us. Here again the author puts forward some elaborate statistics of his own, and certainly his experience of iridectomy appears to have been remarkably bad; but the figures have a very doubtful significance. He claims to show

that glaucomatous eyes which are not "treated etiologically"—by glasses, &c.—go blind whether iridectomised or not, while those which are treated etiologically are preserved without iridectomy. It does not occur to him, apparently, that other ophthalmic surgeons are in the habit of correcting errors of refraction, and that the eyes which are not thus treated are commonly those which are too far gone either to be aided by glasses or to be permanently cured by iridectomy—at any rate his statistics give no information on this point. On the other hand, he tells us nothing of the duration of the cures which are effected by glasses without iridectomy.

Remembering that overaction of the ciliary muscle—combined in a somewhat complex manner with arrest of activity in some of its fibres—is the essential and only cause of glaucoma, we look with interest for an explanation of the curative action of eserine, but here for once the theory hardly rises to the occasion and, as the author puts it, much remains in darkness.

The third and fourth parts of the book deal respectively with the pathology of convergence and with the prophylactic and therapeutic lessons which may be gathered from the earlier chapters. With these we do not propose to deal, except to point out that the author has certainly the courage of his opinions. In his closing sentence he assures us that the recognition of the real causes of cataract and glaucoma will enable the ophthalmic surgeon of the future to prevent the occurrence of these dreaded maladies in those who place themselves early enough under his care. Twenty-four pages of faithful reproductions of untouched photographs illustrate the many anatomical points on which the author insists, and complete the work.

Dr. Schoen's book is a very remarkable one. It represents a vast amount of earnest labour, and shows an intense and enthusiastic conviction on the part of its author. It contains many observations, especially of the statistical kind, which are suggestive of points for further inquiry. We are bound, however, emphatically to express the

opinion that the elaborate theories which pervade it are to a very large extent fallacious, and that should the author's pupils, or the readers of his book, accept his doctrines as a practical guide in dealing with cases of cataract and glaucoma, much harm would certainly be done.

P. S.

MITVALSKY (Prague). The Spontaneous Cure of Complete Senile Cataract, by Intracapsular Absorption. *Centralbl. f. prakt. Augenheilkunde. Oct.*, 1892.

Mitvalsky has collected the cases of spontaneous cure of senile cataract recorded during the last eight years, and as he has found some eighteen cases reported, and is able to add notes of two under his own observation, he concludes that the occurrence is less uncommon than is usually supposed. He gives short notes of seventeen of the twenty cases, and these we give below, rather more briefly than he does. The name of the surgeon reporting each case is given at the beginning of the notes. Mitvalsky considers these cases authentic, but it is more than probable that doubts will arise in his readers' minds whether two or three of them can be regarded as indubitable instances of *intracapsular* absorption of cataractous lens matter.

I. Szili.[1] A medical man, aged 65. R. cataractous, eight years, cataract ripe three and a-half years. Two glaucomatous attacks in this eye three years before Szili saw him, and after the second attack the lens began to clear. A remnant of the nucleus contained in the capsule was freely movable and blocked the pupil when the head was bent forwards. V. + 11 D. = $\frac{5}{9}$; + 15 D. = 0.5 Sn.

II. Lange.[2] Male, aged 58. L. cataract began eleven years previously, and in four years became mature. When seen by

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[1] Hirschberg's *Centralbl.*, 1884, p. 17.

[2] Von Græfe's *Arch.*, xxx. 3, p. 211, and xxxii. 4, p. 281.

Lange there was a morgagnian cataract, with clear fluid cortex. V. + 6 D. = $\frac{4}{60}$; + 12 D. = 2.25 Schweigger's type. Volume of lens not materially altered. Two years later the fluid cortex had been absorbed. The capsule was shrunken and contained remains of nucleus. V. + 9 D. = $\frac{4}{60}$.

III. Nordmann.[1] Male, aged 56. Double complete cataract three years. Extraction of left lens. Absorption of the cortical layers of right lens, leaving opaque nucleus in lower part of capsule. The latter dotted with white chalky opacities. R. + 10 D. = $\frac{6}{360}$, with stenopaic disc $\frac{6}{9}$; + 18 D. = J. 2.

IV., V., VI. Brettauer.[2] (1) Male, aged 45. In 1862 a half ripe cataract in L.; in 1871 lens flattened, substance nearly clear, containing tremulous cholesterin crystals; in 1885 the capsule empty, and separated from the ciliary processes at lower outer part. V. + $\frac{1}{5}$ = $\frac{20}{40}$. (2) Male, aged 50. In 1867 an unripe cataract in L. eye; in 1881 began to regain sight in that eye, and Brettauer found a morgagnian cataract with clear cortex, nucleus at lower part and cholesterin crystals. V. + 11 D. $\frac{6}{36}$; in 1885 the nucleus had disappeared, and the shrunken capsule only remained. (3) Female, aged 48. L. unripe cataract in 1871; in 1884 sight began to improve. Appearances similar to the two previous cases; V. + 12 D. = $\frac{6}{9}$.

VII., VIII. De Wecker.[3] Two patients, nearly 70, each operated on for L. cataract. The cataract in the R. eye of each patient became morgagnian, and an acute glaucomatous attack supervened. Iridectomy performed. The lens matter subsequently became almost completely absorbed, leaving only a shrunken nucleus at the bottom of the capsule. In one case cholesterin crystals visible inside the lens capsule.

IX. Meyer.[4] Male, aged 59. Failure of vision in R. seventeen years; two years before he was seen, severe inflammatory attack in R., lasting fourteen days. Vision, only perception of light. Pupil black, lens capsule empty, with scattered specks on anterior surface. Glaucomatous excavation of O. N.

X., XI., XII. Czermak.[5] (1) Male, aged 64. Right eye failing five years, blind three years; eye glaucomatous, lens capsule containing only the nucleus, sunken to the lowest part. O. D. deeply excavated. (2) Female, aged 71. L. eye amblyopic since child-

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[1] Knapp-Schweigger's *Arch.*, xiv., p. 165.

[2] Ber. u. d. 17 *Versam. d. Oph., Gesellsch. z. Heidelberg*, 1885, p. 47.

[3] *Traité complet.*, ii. 702.

[4] Von Græfe's *Arch.*, xxxiii. 1, p. 159.

[5] *Klin. Monatsbl. f. Augenheilk*, xxix., pt. 4.

hood. Nine years previously an inflammatory attack with pain; Czermak found posterior synechiæ, the nucleus lying at the bottom of the shrunken lens capsule; fundus dimly seen, apparently normal. (3) Male, aged 65. R. mature cataract; iridectomy for increased tension following use of cocaine. Nine weeks later nearly all lens substance absorbed, leaving capsule containing loose nucleus. V. + 12 D. = $\frac{15}{60}$.

XIII. Natanson.[1] Male, aged 65. R. defective fourteen years. Lens represented by a shrunken nucleus at lower part of a degenerate capsule. V. + 12 D. $\frac{3}{60}$, T. n.

XIV. Higgens.[2] Male, aged 57. R. failing ten years, and in eight and a-half years could see only in periphery of field; then central vision began to improve, and in eighteen months nearly the entire lens had undergone absorption, leaving only some opaque capsule. V. + 11 D. = $\frac{6}{36}$; + 14 D. = 10 J.

XV. Lang.[3] A patient in which absorption of lens matter, leaving only the nucleus, took place in two years. Vision with correcting lenses good.

XVI., XVII. Mitvalsky.[4] (1) Female, aged 77. Double cataract; extraction of L. fourteen years ago, with good result. R. at that time blind. No attention paid to R. till some years afterwards, patient discovered accidentally that it had regained sight. R., deep A.C., tremulous iris, pupil circular; dark amber lens nucleus loose in its capsule, visible at lower outer part of pupil. Punctiform opacities in vitreous, fundus normal. V. + 12 D. = $\frac{1}{5}$. The capsule and its contents were removed, and vision, with a glass, was raised to $\frac{1}{1.5}$. (2) Male, aged 65. R. extraction of cataract six years previously; L. mature cataract eight years, no operation; one year before found that vision of L. had returned. L., A. C. deep, iris tremulous, pupil black in upper part, lower part occupied by a yellow nucleus contained in the capsule, on which were small scattered opacities. Fundus normal; V. + 12 D. = $\frac{6}{12}$.

The remaining three cases to which Mitvalsky gives references only were recorded by Sprimon,[5] Kipp,[6] and Gad.[7]

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[1] *Klin. Monatsbl. f. Augenheilk*, xxix., p. 423.
[2] *Oph. Soc. Trans.*, xii., p. 107.
[3] *Ibid.*
[4] *Centr. f. pr. Augenheilk*, Oct., 1892.
[5] *Medycyna*, 1886, p. 176.
[6] *Amer. Jour. of Ophth.*, iv., 6. p. 157.
[7] *Nord. Ophth. Tidskrift, bd.* i. p. 262.

In the majority of the reported cases, the change in the cataractous lens consists apparently in the cortical layers becoming fluid, and subsequently undergoing absorption, leaving generally an opaque nucleus of variable size, which sinks to the lower part of the capsule. The latter often becomes wrinkled and detached from its suspensory ligament in some part of its circumference. It is probably incorrect to speak of the lens capsule as containing nothing but a shrunken nucleus, often described as movable within the capsule. The remaining intra-capsular space is probably occupied by transparent fluid. The size of the unabsorbed portion of lens, *i.e.*, the nucleus, seems to vary a good deal.

In nine of the seventeen cases reported, the cataract was uncomplicated. In six, glaucoma occurred, and in those in which iridectomy or other operative procedure was adopted for the relief of tension, the possibility of accidental wound of the lens capsule cannot be lost sight of. This is especially so in Case XII. in the above list.

J. B. L.

H. Dor (Lyon). On Contact Lenses. *Revue Générale d'Ophtalmologie. Nov.*, 1892.

After some brief introductory remarks on the subject of regular astigmatism, Dor discusses the optical correction of conical cornea and irregular astigmatism generally by various kinds of glasses. It appears that Dor devised conical glasses in 1876, and he claims that they gave results at least equal to those given by Raehlmann's hyperbolic lenses. He points out, however, that conical glasses have not become part and parcel of every-day practice, probably because the improvement effected in sight by them is lost as soon as the eye and the glass are no longer accurately centred. The author next describes the contact glasses introduced by Fick of Zurich in 1888.

Working on the idea that it was necessary completely to eliminate the action of the cornea, Fick replaced that structure by a glass shell possessing the normal curvature of the cornea. This mask was applied directly to the eye, and the space between it and the cornea was filled with fluid of the same index of refraction as the aqueous humour. After many trials, Fick selected a 2 per cent. solution of grape sugar as most suitable for this latter purpose. The first glasses were blown, but it was soon found that the curvature thus obtained was not sufficiently regular, and Fick therefore had a contact lens specially ground by Abbé, of Jena. The improved glass had a radius of curvature of 8 mm. in order to correspond to that of the natural cornea; while a wider part, having a radius of 15 mm., was constructed to rest upon the sclerotic and thus to support the corneal part of the lens. With this lens Fick obtained satisfactory results, but the glass was merely a sample, and on that account nobody has been able to repeat his experiences.

At the last meeting of the French Ophthalmological Society, Sulzer announced that Benzoni, an optician at Geneva, had succeeded in constructing a satisfactory contact lens, and Dor hastened to obtain duplicates. The price charged, forty francs apiece, seemed excessive until Dor had satisfied himself that the curvature of the glasses was perfection itself, and that the cost named was merely that of good workmanship.

Dor finds that the use of these glasses is not very agreeable to the patient, although cocaine renders them tolerable. It is not difficult to place the lens in position, but the introduction of liquid between the glass and cornea is somewhat troublesome. To effect the latter, the upper border of the glass is raised with a suitable instrument, and the liquid introduced by means of a pipette. Dor's first patient suffered from conical cornea and central corneal opacity, and had had double iridectomy performed for the relief of those conditions. Sight of the left eye equal to 20/70 with a hyperbolic lens; with a contact glass and minus 5 D. spherical, the patient recognised

20/60 and No. 2 Snellen. This patient wore the contact lens for three hours without discomfort.

The following table is given in the original paper.

			With Contact Glasses.
1	Mlle. E. G.	Astig. myopic irreg. V. 20/50 with — 1.50 cyl. axis 90°.	V. 20/30.
2	M. Ch.	Aphakia following cataract extraction. V. 20/400 with + 13 D. sph.	V. 20/100.
3	Mlle. H.	Hypermet. and Astig. irreg. V. 20/400, 20/200 with + 6 D. sph.	V. 20/100.
4	Mlle. D.	Hypermet. and Astig. V. 20/70. Snellen No. 4	V. 20/30. Snellen No. 1.
5	Mlle. B.	Astig. hypermet. V. 20/70, 20/50 with + 2 D. cyl. axis 90°	V. 20/20, with + 2 D. sph.
6	Enf. M.	Astig. myopic. V. 20/200, 20/20 with — 4.50 cyl. axis horizontal	V. 20/20, with — 4 D. sph.
7	Mlle. B.	Astig. myopic. V. 20/70, 20/30 with — 2 D. cyl. axis 90°	V. 20/20, with — 2 D. sph.
8	M. Er.	Hypermet. and astig. hypermet. V. 20/70, 20/30 with + 5 D.	V. 20/20, with — 2 D. sph.
9	M. M.	Central opacity of the cornea. Iridectomy performed in 1882. V. 40/400	V. 20/70.

With regard to the above table, Dor remarks that the greatest improvement took place in cases of hypermetropia. Furthermore, that the good results obtained in the near vision of cases of myopic astigmatism should be corrected for distant vision by a spherical glass, the explanation of this being that the optical axis becomes lengthened by the layer of liquid intervening between the contact lens and the cornea. An axial myopia is thus produced, the amount of which is variable, but which, on an average, is equal to two dioptres.

Dor concludes: "To sum up, the contact glass of to-day is not very easy to apply, and renders true service only in irregular astigmatism of considerable amount, perhaps with, perhaps without, corneal nebulæ, and in cases of conical cornea. On the other hand, it will be useful in making an immediate diagnosis of irregular astigmatism. Lastly, from a physiological point of view, it will permit us,

by eliminating the action of the cornea, to study the still controverted question of astigmatic contractions of the crystalline lens."

In a postscript to the paper, Dor recounts an additional instance of improvement effected by the contact lens. The case was one of conical cornea, not associated with central nebula. The sight was improved from 1/80 to 1/2. The author makes the obvious remark that such optical correction does not do away with the necessity for operation in conical cornea, since that disease is progressive in the absence of surgical interference.

SYDNEY STEPHENSON.

SCHIESS (Basel). Riband-like Keratitis. *V. Graefe's Archiv, XXXVIII. p.* 149.

The author reports a case of the above form of corneal opacity which terminated in a cure—an event sufficiently uncommon to be worth recording.

The affection occurred in both eyes of a man aged 31, who dated the opacity from a renal attack he suffered from some three years previously, and who was now suffering from chronic bronchitis after influenza. The opacity was of a greenish gray colour, and was made up of a number of small punctiform opacities which were confluent in places. The corneal surface was smooth, and the unaffected portion perfectly normal. A small transparent zone separated the opacity from the sclerotic. The appearances were essentially similar in the two eyes. Tension high on both sides, but nothing else pathological except catarrhal conjunctivitis. Fomentations, eserine, corrosive sublimate lotions, and iodide of potash (internally) were prescribed, with the results of lowering tension and benefiting the conjunctivitis. The patient refused to have an iridectomy performed on either eye, and went home with instructions to use pilocarpine.

The pilocarpine was the only therapeutic agent subsequently employed, but the patient wrote to say he was nearly as well so far as his eyes went as ever he was. He attributed the cure to eating a large quantity of grapes and drinking large amounts of sweet pear juice during the autumn. When seen again in the spring the eyes were apparently normal, but a careful examination showed that there were still traces of the former opacities in both eyes, and a perimetric defect, which existed formerly, was also still present. Tension rather high in both eyes.

Schiess regards this case as one of typical riband-like keratitis as described by Græfe, *i.e.*, riband-like opacity without any complication. Of course the disease may return and the eyes may possibly become glaucomatous, as occurred in the typical cases described by Græfe, but for the time at least the cure may be regarded as complete.

J. B. S.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, DECEMBER 8TH, 1892.

HENRY POWER, F.R.C.S., President, in the Chair.

Kerato-Malacia in Young Children.—Mr. Holmes Spicer read this paper, with notes of several cases. Young children are more liable than adults to gangrene of the cornea when their vitality is reduced below a certain level; the gangrene may occur spontaneously or as the result of comparatively slight attacks of conjunctivitis. In the late stages of tuberculous meningitis and in infantile diarrhœa, the cornea undergoes destruction, but this is due partly to exposure and partly to insensibility. After measles or whooping-cough with bronchitis, and in malignant varicella, where there has been much exhaustion, the cornea is not

infrequently seriously damaged by large perforating ulcers. After serious malnutrition the cornea may slough spontaneously; this is not uncommon among nurslings in countries where the mothers practise long religious fasts; in this country it is rare except among the hand-reared, who have had insufficient nitrogenous diet. Kerato-malacia generally attacks both eyes of children from four to nine months old; it begins with dryness of the conjunctiva, with patches of froth on its surface, and with night-blindness; soon the whole cornea becomes opaque and perforation occurs; the cases often terminate fatally. The treatment should be increase of the nitrogenous elements of food, some meat juice or raw meat finely pounded, in addition to milk for young babies, and cod-liver oil; and locally, eserine in the form of ointment to the eye, with warm applications to the lids. Some of the cases with this treatment made a good recovery; in one case the cornea recovered, although the child succumbed eventually.

The President spoke of kerato-malacia in adults, and mentioned a case he had recently seen in a woman completely crippled by deforming arthritis.

Mr. Drake-Brockman had met with many cases of kerato-malacia in India during famine, and in epidemics of cholera, and not infrequently in chronic dysentery. In children the condition was, he thought, often associated with congenital syphilis. In some cases destruction of the cornea occurred with extraordinary rapidity.

Mr. Doyne mentioned the case of a child 6 weeks old, in which the cornea eventually cleared almost completely.

Mr. Priestley Smith (Birmingham) referred to the necessity of carefully watching the cornea in children and others prostrated by serious illness. In such cases the corneæ were often exposed during sleep, and were prone to severe ulceration. Protection of the corneæ by a bandage, or adhesive plaster on the eyelids will often prevent this dangerous complication. Sometimes union of the margins of the lids is necessary, and to effect this he had had recourse to a procedure differing a little from that ordinarily em-

ployed in blepharoplasty. He split each lid at the margin, in its long axis (as in Arlt's operation for trichiasis), and by means of stitches brought together the raw surfaces of the gaps in the upper and lower lids. By this means no loss of tissue was incurred, and in his experience the results were very satisfactory.

Panophthalmitis following Lacrymal Abscess.—Dr. Rockliffe (Hull) read notes of this case. The patient, aged 63, had suffered for thirty years from lacrymal obstruction, but never before the present attack from abscess of the sac. The suppuration in the lacrymal sac was followed by conjunctivitis, chemosis, keratitis with hypopyon, panophthalmitis, and excision of the globe. On examination the whole eyeball was filled with inflammatory products, and there had been much matting of the orbital tissues.

Dr. Hill Griffith (Manchester) thought that if the cornea had entirely escaped injury, the case was unique. He had seen one case in which suppurative panophthalmitis had followed lacrymal abscess, but in that instance the cornea became accidentally abraded by the end of a lead style.

Mr. Adams Frost referred to a case in which infection of the orbital cellular tissue occurred through a small wound of the conjunctiva, and led to complete destruction of the eyeball.

Cicatricial Ectropion treated by Tweedy's Operation.— Dr. Rockliffe (Hull) reported the case of a man who had been kicked in the face by a horse, dividing the lower lid close to the inner canthus, and splitting the cheek open. The resulting cicatrix produced ectropion. Tweedy's operation was performed with results quite as satisfactory as in cases in which the deformity was at the outer canthus.

A Case of Probable Rupture of the Optic Nerve.—Dr. Johnson Taylor (Norwich) read notes of the case of a young man, who in stooping to pick up kindling wood, struck his right lower eyelid violently against the end of a piece of wood standing obliquely on the floor, with the result of immediate and permanent loss of sight in the right eye. The neighbouring bone was not struck, there was no probability of penetration, the skin alone of the lid appeared to have

been broken; no tenderness or swelling of the eyelid, or conjunctiva followed, and only slight temporary patchy discoloration of the skin resulted. No headache, vomiting, or other symptoms ensued: the patient immediately resumed his work and continued it for several hours. When seen for the first time, five days later, the right eye had no perception of light, the direct pupillary reflex was entirely absent; the indirect reflex and contraction of the pupil with convergence were normal; movements of globe normal. The appearances on ophthalmoscopic examination were almost *nil*, and quite inadequate to explain the symptoms. About five weeks later the optic disc showed decided signs of atrophy. After discussing the possible explanations of the case, Dr. Taylor suggested that the optic nerve had been ruptured either by sudden violent and extreme rotation of the globe, or by overstretching, the result of the sudden proptosis produced by the piece of wood being driven in between the eyeball and the lower orbital margin. The patient was shown at the meeting.

Mr. Adams Frost mentioned a case he had seen at Moorfields, in which the stem of a tobacco-pipe had penetrated the orbit and ruptured the optic nerve. The disc became recognisably atrophic in four to six weeks. The external wound was so insignificant that if the pipe stem had not remained in the orbit till the patient came to the hospital, it would have been impossible to say that there had been more than a cutaneous wound. He thought that in Dr. Taylor's case, direct injury to the nerve by penetration of the piece of wood was the more plausible explanation.

Mr. C. Wray spoke of a patient under his care, in which, after removal of the blind eye, an orbital exostosis was found, against which the nerve might easily have been compressed.

Mr. Bullar (Southampton) referred to a case, in some respects similar to Dr. Taylor's, in which there had evidently been a perforating wound of orbit.

Mr. Tweedy mentioned the case of a man under his care at University College Hospital, in whom a piece of tobacco-

pipe stem had entered the orbit, damaged the optic nerve, causing blindness, and had remained in the orbital tissues for two years. The man was unaware that he had received any injury other than a "scratch" on the eye.

Living and Card Specimens.—Dr. Bronner (Bradford): Portable Sterilizing Apparatus for Instruments and Bandages and Dressings.—Mr. Juler (1) Guttate choroiditis; (2) Cyst of Iris; (3) Pemphigus of the conjunctiva.—Mr. Lawford: New Growth in Ciliary Region.—Mr. Hartridge: Intraocular growth.—Mr. Frank Haydon: Ophthalmoscopic Atlas for recording Changes in the Fundus Oculi. Mr. Silcock: Recurrent Growth in both orbits, probably syphilitic.—Dr. A. Sandford (Cork): (1) Double Sarcoma of Orbit in an Infant; (2) Gunshot Wound of Eyeball.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

Twenty-eighth Annual Meeting, held at New London, 1892.

Dr. Geo. C. Harlan, Vice-President, in the chair.

Removal of Steel from the Vitreous; Vision Preserved.—Dr. S. Theobald, of Baltimore, reported a case in which a very small piece of steel had passed through the margin of the cornea and periphery of the iris, missing the lens. It had been in the eye eleven days, and excited dangerous inflammation, and owing to clouding of the vitreous could not be localised with the ophthalmoscope. An incision 4mm. long was made, under antiseptic precautions, between the inferior and external recti muscles, and the magnet point, sterilized by boiling water, introduced. After several unsuccessful attempts the bit of steel was withdrawn. There was considerable hæmorrhage, but no loss of vitreous. Recovery was rapid and uninterrupted, and after three

months the eye was free from inflammation and photophobia, vitreous clear, and vision 20/25.

Foreign Body in the Retina.—Dr. F. Buller, of Montreal, reported the case of a youth, aged 20, who had received an injury of the left eye by being struck with a piece of metal six days before coming under observation. There was a perforating wound of the cornea, iris and zonula, but no opacity of the lens. About three and a-half disc diameters below the nerve was seen a piece of metal lying in the retina, and from it blood could be traced forward through the vitreous. Rest and the instillation of a two-grain solution of atropine were ordered. A zone of opacity around the foreign body gradually increased. At the end of a month the eye felt well, and vision was 6/12, but there was a severe localised neuro-retinitis, and marked choroidal atrophy surrounding the foreign body. The retina cleared up, and at the end of four months the vision in this eye was as good as in the other, *i.e.*, nearly normal. The piece of steel was still visible in its original position. Fourteen months after the date of injury it had moved out of sight; the eye was giving trouble; vision was reduced to 6/27, and there were fine opacities in the vitreous—a diffuse hyalitis. The former seat of the foreign body was marked by a small patch of pigment.

Dr. Chas. J. Kipp, of Newark, had in three cases removed foreign bodies that had been in the eye from six months to two years. In the first case the eye had been blind two years, and suffered from irido-cyclitis; an incision was made through the sclerotic and a chip of iron extracted with the magnet without difficulty. There have been no further attacks of inflammation, and the necessity for the removal of the eye has apparently passed away. In a second case seen immediately after the accident the foreign body had penetrated the lens, causing traumatic cataract. The eye was left alone, and remained quiet for nine months. It then became red; the cataract being but partial, there could be seen in addition to ordinary vitreous opacities some white particles, which, it was supposed, might

be portions of a recently ruptured capsule enclosing the foreign body. The magnet operation was successfully performed, and five years later the eye had vision equal to 5/9, and except for the partial opacity of the lens was healthy. In the third case the foreign body was removed without difficulty during a violent attack of inflammation; the eye-ball subsequently became atrophied, but was painless. In a fourth case the foreign body was removed shortly after the injury, but when the traumatic cafaract and vitreous opacities had cleared up, detachment of the retina was found. In six other cases the attempt to remove pieces of steel with the magnet had failed. In none of these cases could the foreign body be seen; in none of them has any reaction of consequence followed the procedure.

Dr. D. S. St. John Roosa, of New York, thought that too much stress could not be laid on the importance of early removal of the foreign body, but too much might be made of the favourable influence of such a procedure on the prognosis. A few weeks ago he had successfully removed a piece of metal ten days after the accident, but he had just heard that the eye was undergoing such serious inflammation as probably to make enucleation necessary. No matter how promptly or successfully the foreign body is removed, the eye, as a result of the original injury, is left in a condition of danger of sympathetic inflammation, or of destructive inflammation of the injured eye itself.

Dr. Lucien Howe, of Buffalo, thought that in the recognition of foreign bodies, slight opacities on the lens capsule are of great importance. He had been able to find the foreign body by placing an iridectomy knife in contact with the magnet, and so magnetising it, and using it as a magnet. He thought that not infrequently the foreign body is drawn up to the opening and then scraped off at the moment of removal.

Dr. H. D. Noyes, of New York, instanced Hirschberg's statistics as giving good vision after magnet extraction in but 10 to 20 per cent. of cases, the rest of the eyes having either shrunken or been enucleated. He had removed a traumatic capsular cataract, and found its cause in a

foreign body on its posterior surface. It had created no disturbance in the eye. In these cases, however, the point of most interest is the liability to transmission of the morbid process to the other eye, and the mode of such transmission. He had recently seen a case in which the sympathetic inflammation had begun with neuro-retinitis. Enucleation of the exciting eye had been followed by almost complete recovery.

Glioma following Irido-choroiditis from Contusion.—Dr. Chas. S. Bull, of New York, reported the case of a girl aged 3 years, struck ten days before on the left eye with the bowl of a large spoon. She had at once complained that she could not see, and there was now central infiltration of the cornea, with loss of epithelium, dilated immobile pupil with discoloured iris, and hazy vitreous with a yellowish reflex from the nasal part of fundus. No pain or sensitiveness on pressure. One week later numerous hæmorrhages occurred in the retina and vitreous, and the tension increased. All external signs of inflammation then subsided. Three months later there was detachment of the retina involving two-thirds of the fundus. The yellowish reflex remained, with vessels running over it. The tension kept above normal, and six weeks afterwards the sclera in the ciliary and equatorial regions became thinned. Enucleation was refused. Three months later the child was anæmic and emaciated, there were large ciliary and equatorial staphylomata, lens opaque and pushed against the cornea, and tension high. Enucleation was now done and followed by improved health. But two months later there was headache, nausea and enlargement of the preauricular and submaxillary glands. Three weeks after this a recurrence was discovered in the orbit, and three months after the enucleation the right eye was involved in the lower nasal quadrant. The left orbit became filled with the growth, and the left glands enormously enlarged. The child died sixteen months after the blow on the eye. The microscope showed gliomatous masses.

Hyaline Bodies [Drusen] in the Nerve Head.—Dr. G. E. de Schweintiz, of Philadelphia, reported a case occurring in a man aged 45, with a history of injury to the head some twenty years ago. The optic nerves were partially atrophied, and the globular masses appeared in a circle slightly within the apparent margin of the nerve-head, and were capped with shining particles which glistened like cholesterin crystals. At the *post-mortem* examination the eyes and brain were removed, and the following lesions were found. (1) Compound hyaline bodies, or "Drusen" in their seat of predilection, within the tissue of the papilla, anterior to the lamina cribrosa. (2) Atrophy of the optic nerve, which may or may not have preceded the formation of the "Drusen," but evidently was not caused by them. (3) Thickening of the coats of the arterioles in the optic nerve below the lamina, and in the central artery in the neighbourhood of the "Drusen," a change in the adventitious coat of the vessel, suggesting hyaline degeneration, but shown by differential stains to be composed of material different from the "Drusen." The retina and choroid exhibited no distinct pathological lesion save some thickening of the vessel walls; excrescences springing from the lamina vitrea were absent. The other cranial nerves, so far as examined, were normal. Investigation of the structure of the brain yielded a negative result, and hyaline changes in the blood-vessels were not present. Dr. de Schweinitz believes, with Hirschberg and others, that the "Drusen" have nothing in common with the choroidal excrescences, but that they are the expression of a pathological process confined to a small portion of the optic nerve. The investigation in this case included a considerable part of the cranial nerves and the brain. The change in the coat of the central artery was probably only an associated lesion having to do rather with the inflammatory process which had preceded the atrophy, than with the formation of the "Drusen." The paper was illustrated by photo-micrographs by Dr. Wm. M. Gray, of the Army Medical Museum.

The Full Correction of Myopia.—Dr. Edward Jackson, of Philadelphia, advocated this as a rule of practice which should be departed from only for certain definite and important indications, that were met with in exceptional cases. The evolution of the eye has been toward a standard of emmetropia, and when this is not attained the error is usually to the side of hyperopia. If there is one form of ametropia to which, more than any other, the nutritive processes of the eye are not adapted, it is myopia. Still many ophthalmic surgeons were unduly timid as to the prescribing of concave lenses. It was to overcome that timidity, which he had formerly shared, that he offered his experience in this direction. He reported twenty-seven cases of myopia, observed and carefully remeasured after the lapse of from three to ten years. Of the fifty-four eyes examined only eight eyes (five persons) showed an increase of over one-quarter dioptre in myopia, while in four eyes it had diminished to the same extent. In but three persons was the increase of myopia of any importance, and in these it had occurred between the ages of 12 and 25 years during severe eye-work, and ceased subsequently under the use of the correcting lenses. And in no case had it been attended by any loss of visual acuteness or degenerative changes in the choroid. The principal contra-indications were inability to appreciate the perfect focussing of light on the retina, as from diminished visual acuteness, and the fact that binocular fusion had been given up in the interests of better monocular vision. The discomfort experienced on first wearing the glasses was not a contra-indication. Even where accommodation at first appears deficient it rapidly improves to the normal standard under the wearing of the correcting lenses.

Dr. Geo. C. Harlan, of Philadelphia, reported twelve cases in which, beginning at the ages of 12 to 25 years, the full correction of myopia of from four to sixteen dioptres had been constantly worn for from five to twenty-five years. In eight the myopia remained stationary, in three there was increase of from 0.50 to 1.50 D., and in one of 2.50 D. There was not the slightest loss of acuteness of vision in

any case. He considered excessive convergence without accommodation the most important factor in progressive myopia, and the restoration, so far as practicable, of the normal relation of these two functions the most valuable therapeutic measure. The amount of accommodation that exists or can be acquired by gradually increasing lenses should be the chief guide in deciding on the glasses to be used. When full correction is impossible, it is better to wear constantly the strongest glasses with which comfortable reading is possible than to use two pairs of glasses.

Dr. S. D. Risley, of Philadelphia, agreed that in young people myopia should be corrected fully in a large number of instances, and the glasses be worn constantly. But where the myopia is progressive, the pathological changes of the interior marked, and the eyeball tender, special reading glasses should be given, and the want of harmony in convergence be met by the association of prisms. He had found that the careful correction of the astigmatism found associated with the myopia had been very satisfactory in securing comfort to the individual, and preventing the progress of the myopia.

Form of the Cornea.—Dr. Swan M. Burnett, of Washington, presented a table of the ophthalmometric measurements of forty-one corneæ, taken at the visual axis and at intervals of 5° along the principal meridians. These demonstrate that the cornea gradually diminishes in curvature from the visual axis towards the periphery. This diminution is greater to the nasal side, both in emmetropia and ametropia. The average at 15° from the visual axis was 2 D. on the nasal, and 0.5 D. on the temporal side. In the vertical meridian the diminution is less than on the nasal side, but greater than on the temporal. A practical inference is that the place of election for optical iridectomy is the temporal side of the cornea.

Some Incidental Phenomena of the Shadow Test. Dr. Burnett called attention to the play of shadows more or less crescentic, which change their position and shape with

each change in the position of the mirror, exactly as in conical cornea, only in not so pronounced a degree. These necessarily come from some obstacle to regular refraction of the rays from the illuminated retina in their passage outward. Where this defect lies he had not been able to determine. Careful ophthalmometric examinations showed in only a single case a deviation of the corneal curve from that which can be considered normal. In some cases there was a history of previous inflammation, and the cornea might have healed with a normal surface, but with some change in the density of the tissue beneath. In a number of instances where this phenomenon was present, there was a want of correspondence between the lens that gave a reversal of the shadow movement and the glass that gave the best visual acuteness. In no case in which these shadows were pronounced did the visual acuteness come up to the normal standard. It would seem that the shadow-test is to be relied on implicitly only when there is perfect regularity of the refraction; and conversely it is of great value in detecting irregularities not otherwise determinable.

Symmetry of the Eyes as Manifested in the Direction of the Principal Meridians.—Dr. H. Knapp, of New York, called attention to the symmetry of the eyes as illustrated by the relation of the principal meridians of one eye to those of its fellow, in one thousand cases of astigmatism. The meridians of strongest refraction (shortest radius of curvature) were symmetrical in 84 per cent., being vertical in 60 per cent., horizontal in 11 per cent., and diagonal in 4.3 per cent. Parallelism of the meridians, except in the vertical and horizontal positions, where they are also symmetrical, is very rare.

Dr. Harlan presented similar statistics of five hundred cases, of which 70 per cent. were exactly symmetrical, and 8 per cent. more lay within ten degrees of exact symmetry.

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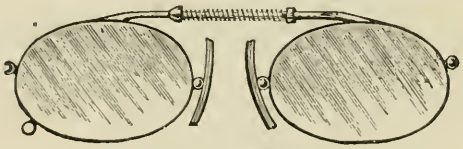

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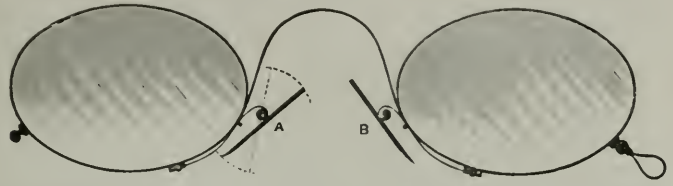

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